

CLAIMS

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

- 1 1. A method of image compression comprising the steps of:
2 analyzing an image in terms of perceptual constructs of the human
3 visual system;
4 searching for patterns among analyzed abstractions of the image;
5 describing the image in terms of the perceptual constructs and the
6 patterns found among them;
7 for a given image that is in a same "class" as the image, re-representing
8 the image by describing the image as a collection of parameterized versions of
9 the patterns prevalent in that class of image;
10 taking a resulting description outside of the context of abstract
11 patterns; and
12 looking for redundancies in the description, then re-representing the
13 data so as to eliminate the redundancies and thereby compress the description.
- 1 2. The method of image compression recited in claim 1, wherein the patterns
2 identified, image components, parameterization of patterns, and lower level
3 numerical encodings are all designed around images belonging to a narrow
4 class of images.
- 1 3. The method of image compression recited in claim 2, wherein the narrow
2 class of images are two-dimensional projections of three-dimensional
3 visualizations of data generated by numerical weather simulations.

1 4. The method of image compression recited in claim 1, wherein the images
2 are of the class exemplified by 2-D projections of 3-D weather model images,
3 said method further comprising the steps of:

4 re-representing entities with smoothly curved borders and an interior
5 fill that can be parameterized and is either largely derivable from other image
6 data or constant, as curve sequences and parameters required to describe the
7 interior; and

8 re-representing entity groups with constant structure that vary only in
9 terms of a spatial parameter as references to the entity group, and a list of the
10 values for the required parameters, each value being for each subsequent entity
11 for the group.

1 5. The method of image compression recited in claim 4, wherein the spatial
2 parameter is orientation or color.

1 6. A method of compression of two-dimensional projections of three-
2 dimensional visualizations of image data comprising the steps of:

3 inputting a two-dimensional image;
4 dismantling the two-dimensional image into components;
5 tracing contours by fitting parametric curves their borders;
6 tracing iso-surface projections by fitting curves to their borders;
7 representing numerical values of curve nodes as distances from one
8 another or a local origin; and
9 storing compact border and color description of contours and compact
10 border and color description of iso-surfaces.

1 7. The method of compression of two-dimensional projections of three-
2 dimensional visualizations of image data recited in claim 6, wherein the data

3 are generated by numerical weather simulations.

1 8. The method of compression of two-dimensional projections of three-
2 dimensional visualizations of image data recited in claim 7, wherein the step
3 of dismantling the input image into components includes separation of solid
4 filled contours, transparent, shaded colored two-dimensional projections of
5 three-dimensional iso-surfaces, arrow color and orientations in three-
6 dimensional space, and text and further comprising the steps of:
7 representing numerical values of arrow colors and orientations as
8 differences; and
9 storing compact color and orientation information for arrows and
10 separated text.

1 9. The method of compression of two-dimensional projections of three-
2 dimensional visualizations of image data recited in claim 8, further comprising
3 the steps of:
4 receiving the compact border and color description of contours, the
5 compact border and color description of iso-surfaces, the compact color and
6 orientation information for arrows, and text; and
7 decompressing the received information to generate a representation of
8 the original two-dimensional image.

1 10. The method of compression of two-dimensional projections of three-
2 dimensional visualizations of image data recited in claim 9, wherein the step
3 of decompressing comprises the steps of:
4 accessing a static background image representing geography and
5 drawing the background;
6 accessing a static description of arrow locations and skew, structure

- 7 and definition of an arrow, and received compact color and orientation
- 8 information for arrows and drawing arrows;
- 9 accessing structure and definition of an iso-surface and received
- 10 compact border and color description of iso-surfaces and drawing iso-surfaces;
- 11 accessing structure and definition of a contour and received compact
- 12 border and color descriptions of contours and drawing color contours; and
- 13 accessing received text and drawing text.